

Stress-Matched RF and Thermal Control Coatings for Membrane Antennas, Phase I

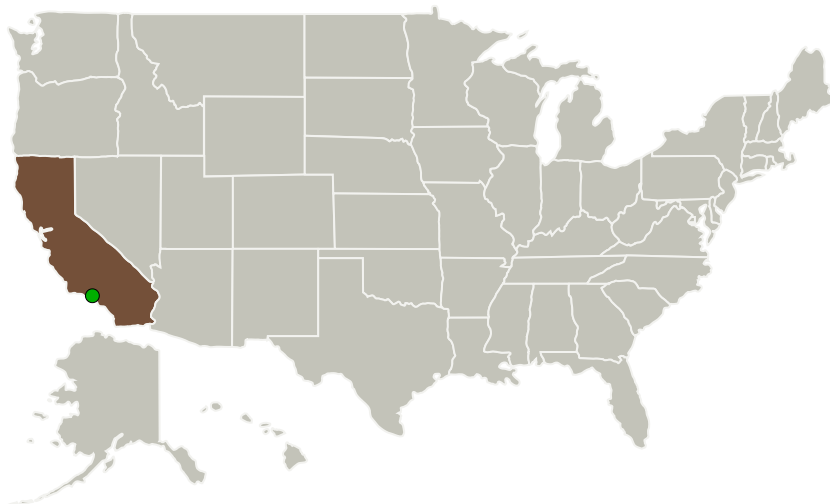
Completed Technology Project (2010 - 2010)



Project Introduction

Development of multi-meter diameter radiofrequency (RF) antennas is an area of intense research for NASA and DoD organizations. Polymer membrane technologies offer the greatest promise of meeting future large antenna requirements, while significantly reducing system mass and launch volume. Recent advances in polymer membrane materials must be matched by advances in the COATINGS needed to provide the required RF and thermal performance in a space environment. The proposed research addresses the requirement for developing a COATED polymer material with zero CTE, while exhibiting the appropriate RF and space durable characteristics. The objective is to develop a coating that will cancel the CTE mismatch between the polymer substrate material and the coating itself, resulting in a zero CTE membrane/coating composite. The coated membrane will exhibit the required RF performance, thermal characteristics, and endurance to atomic oxygen (AO), visible and ultra-violet (VUV) radiation, and space temperature extremes. Surface Optics Corp (SOC) will use expertise in RF/thermal coatings together with recent advances in novel processing that allow the tailoring of coating stress. Partner organization NeXolve will provide the polymer films. NeXolve has the ability to engineer unique polymer formulas that provide appropriate surface properties and tailored CTE.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Surface Optics Corporation	Lead Organization	Industry	San Diego, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Project Transitions

**January 2010:** Project Start**July 2010:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137453>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Surface Optics Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

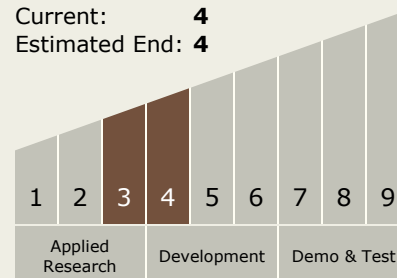
David Sheikh

Technology Maturity (TRL)

Start: 3

Current: 4

Estimated End: 4



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.2 Radio Frequency
 - └ TX05.2.6 Innovative Antennas

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System